NASA's Living with a Star
Measurement Requirements Workshop

The Need for Short Lead Time Solar Wind Data

Presented by
Ron Zwickl
NOAA Space Environment Center

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GSFC

The Need for Short Lead Time Solar Wind Data

Key Questions:

- Current Space Weather Program?
- Internal and External Customer Needs?
- NOAA Plans to meet these needs?
- How can NASA meet these needs/ Requirements?
- Products that LWS should provide?

All responses are from NOAA SEC Perspective

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Current Space Weather Program?

NASA's ACE Satellite Broadcasts:

- Solar Wind plasma ions and magnetic field data
  - One minute time resolution
  - Vector field and plasma ions
- Energetic Ions and Electrons
  - Five minute time resolution
- Location: L1, 1.5 million km upstream of Earth

NOAA:

- Developed and runs ground system to receive real time data
- Processes data
- Uses in Forecast Center (Operations Center)
- Makes RTSW data available on the Web in real time

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Internal and External Customer Needs?

- Only Reliable Short Lead Time Measurement for detection of impending ***Major Geomagnetic Activity***
  - ***About 1 hour lead time***
  - Major is defined at A> 30 and/or Kp > 5
  - ***Low level activity is not important to Customers***
- Useful for Customers capable of rapid response
  - Must be able to respond within about 1 hour
- Useful for knowing why system is acting strange

NOAA Plans to meet these needs

- Recent Plans for Follow-on Mission (1999)
  - **Geostorms/sails was unsuccessful**
    - At present nothing in queue

- Current Plans
  - Attempt to use Triana
  - Will look at all reasonable future options

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How can NASA meet these needs/ Requirements?

Answer the simple Research Question:

How far upstream can a solar wind monitor be placed and still give reliable warnings of impending Major Geomagnetic Activity?

- How much lead time can be achieved?
- What are the limits?
- Does the solar wind evolve over this distance?
- At present we just don't know the answers!

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Products that LWS should provide?

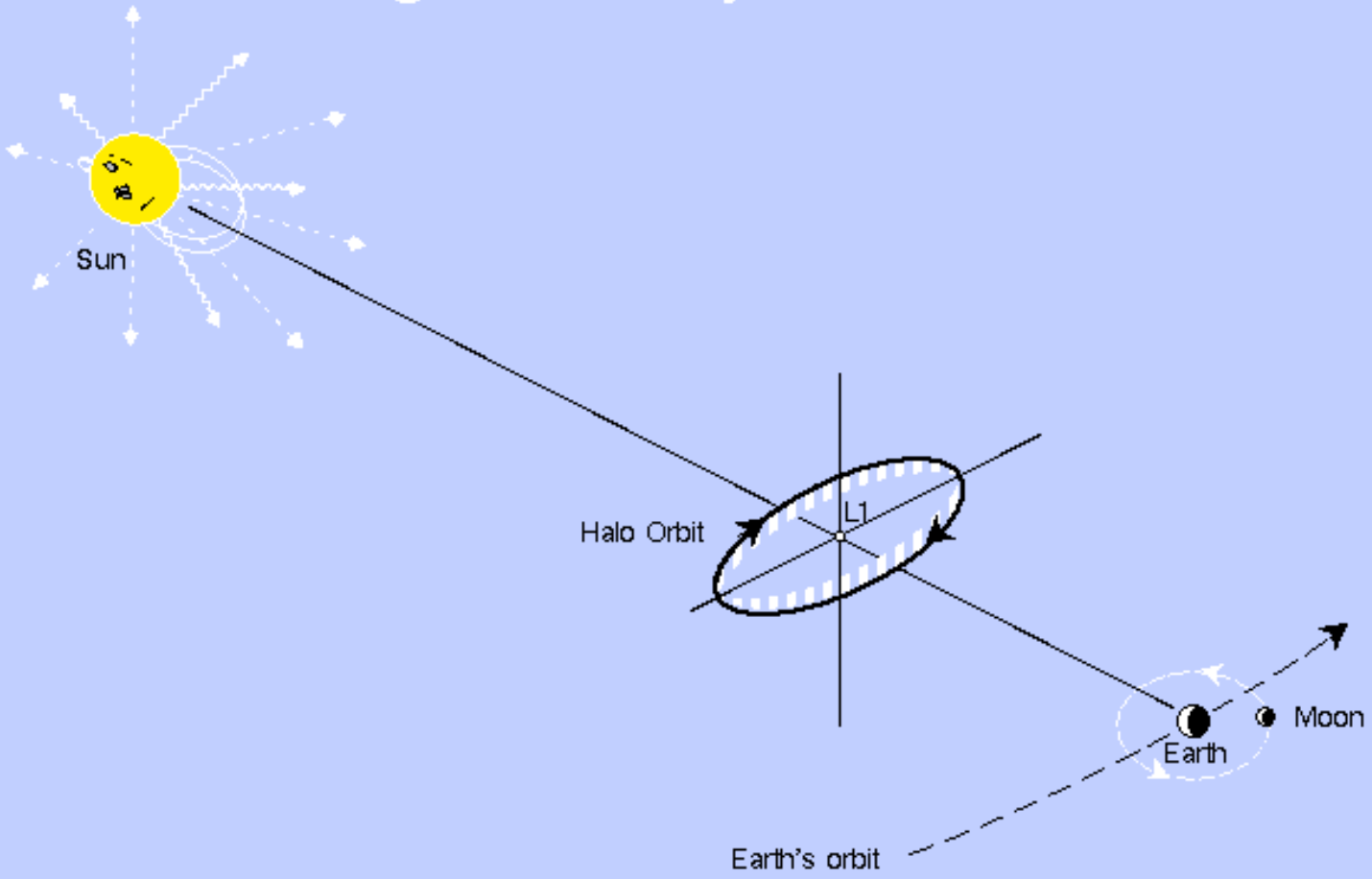
- **At present the LWS program does not address the fundamental need for short lead time solar wind data, nor does it address the key questions of how or where to make the key measurements**

- Solar wind measurements are needed as input to dynamic Magnetospheric and Ionospheric Models

- The only way to develop real time space weather products is to:
  - Develop and run them in real time with real time data

Note: There is a big difference between a research model and an operational model when applied to space weather

Real-time Prediction of Global Geomagnetic Activty with an L1 Satellite



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